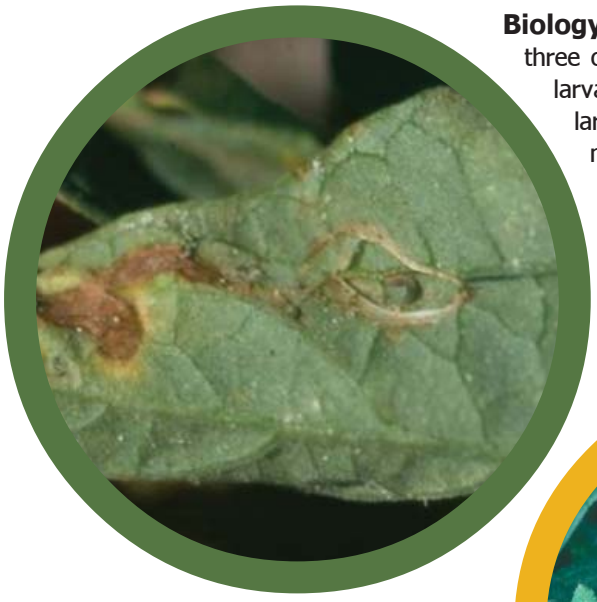
# Tomato Pinworm: *Keiferia lycopersicella*



**Biology & Lifecycle:** Female adults lay eggs individually or in groups of two or three on the undersides of leaves in the upper third of the canopy. Hatching larvae bore into leaves, where their feeding causes a blotch mine. Older larvae feed protected in leaf rolls or folds held together by silking. Larvae may also bore into fruit, usually under the calyx or where infested foliage touches fruit. Mature larvae drop to the soil or plastic mulch surface where they form a silken cocoon covered with sand grains. Infestations often begin on the perimeters of fields. The egg to adult period lasts about 3 weeks at temperatures above 80°F.

**Environmental Factors:** The tomato pinworm may be present year round, but is usually more abundant March-June. The insect over summers primarily on volunteer crop plants, especially tomato.

**Adult:** Adults are small, light brown moths about ¼ inch in length and are most active just after sundown and for a few hours thereafter.

**Immature:** Newly hatched larvae are yellowish-gray with a dark head **(Figure 2)**. Older larvae become progressively darker, changing from brownish-orange to bluish-purple, and reach about 3/8 inch in length **(Figure 1)**.

**Host range:** Tomato is the most important host plant; however, eggplant and potato are also attacked. The insect is recorded from the weed *Solanum bahamese* in Florida. Other solanaceous plants, such as pepper, *Capsium* spp. and nightshades, *Solanum* spp., are not hosts.

**Damage:** Larvae can complete development on foliage **(Figure 3)** and occasionally can inflict nearly 100% defoliation; however, greatest economic damage occurs when larvae attack fruit **(Figure 4)**. Larval damage at the calyx may go undetected and fruit entering the market chain may rot due to invasion of secondary pathogens at the feeding site. Rotting, infested fruit can cause non-infested fruit to rot in shipping boxes.

**Figure 1.** Mature tomato pinworm larva. Photograph by: David Schuster.

**Figure 2.** Tomato pinworm larva. Photograph by: James Castner.

**Figure 3.** Tomato pinworm foliar damage. Photograph by: James Castner.

**Actual Size:**

Larva
About 3/8 inch

**Monitoring:**

**Traps:** Commercially available Pherocon 1C traps baited with pheromone dispensers should be placed on the perimeters of tomato fields and should be monitored at least twice a week. Traps should be placed above the plant canopy and should be raised as the plants grow.

**Scouting:** One leaf from the lower canopy of each of six contiguous plants per two acres should be selected and examined for the presence of larvae.

**Action Thresholds:**
5 moths/trap/night for initiating mating disruption
0.7 larva/leaf for timing insecticidal sprays

*Prepared by: Dr. David Schuster*

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## CULTURAL CONTROLS:

**Start Clean:** Transplants should be free of eggs or larvae.

**Mating Disruption:** Commercial dispensers and liquid encapsulated formulations of mating disruptant can be applied when indicated by pheromone-baited traps.

**Sanitation:** Cull fruit from infested fields should be disposed of as far from production fields as possible.

**Field Manipulations:** Abandoned fields can be a tremendous reservoir of migrating adults. Therefore, fields should be destroyed block by block immediately after final harvest by treating with an effective insecticide combined with a foliarly-applied burn down herbicide.

New fields should not be planted adjacent to old fields.

Volunteer plants should be destroyed, especially during the summer off season, by frequent disking or other suitable methods.

## CHEMICAL CONTROLS:

- Insecticides should be applied when the action threshold is reached.
- Insecticides should be timed to control younger larvae when they are in the blotch leafmines. Older larvae in leaf rolls, leaf folds or fruit are less accessible to insecticides and are more difficult to control. Insecticides may be applied to field perimeters to control early infestations.

## RESISTANCE MANAGEMENT:

- The efficacy of pyrethroid insecticides (many products, 3) has declined to very low levels in research plots in Florida. Resistance to Lannate® (carbamate, 1A) has been documented in Florida.
- Applying insecticides based upon the threshold and in conjunction with cultural controls will reduce the number of applications. Chemicals of different classes should be rotated.

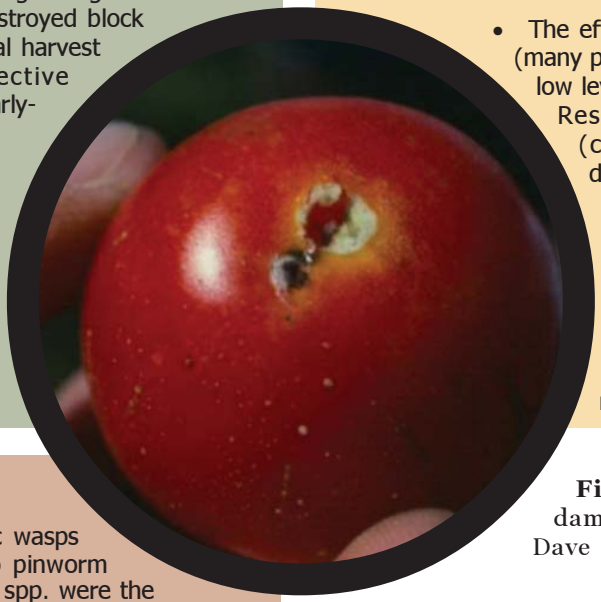

**Figure 4.** Tomato pinworm damage to fruit. Photograph by: Dave Schuster.

## NATURAL ENEMIES:

- Of four species of parasitic wasps observed attacking tomato pinworm larvae in Florida, *Apanteles* spp. were the most abundant. Larval parasitism can reach 50%, but usually not until economic damage has occurred.
- The parasitic wasp, *Trichogramma pretiosum*, attacks eggs and can account for 10 to 90% parasitism.
- Natural enemies can be conserved by avoiding the broad spectrum pyrethroid, organophosphate and carbamate insecticides. Fewer insecticide applications and applications of new, reduced risk insecticides can also enhance biological control.

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